

August 1972

SUP. DOC. NO.

357

FINAL REPORT

PROGRAM 437 DAMAGE ASSESSMENT

HURRICANE CELESTE

357

BACKGROUND

Hurricane CELESTE passed approximately 21 miles northeast of Johnston Island on 19 August 1972 at approximately 1400 hours local time. The atoll was subjected to sustained winds (period of time unknown) of 100 knots with gusts up to 130 knots. The surf produced 30 to 40 foot waves which primarily affected the north and northeast side of the island. All personnel had been evacuated from the atoll.

An air reconnaissance of the atoll was conducted on Sunday, 20 August 1972. The photography proved to be low quality; therefore, initial damage assessment was somewhat conservative, as compared to later on-site evaluation.

The initial recovery plan generated a seaborne cadre consisting of Army Red Hat medical team and Air Force/Holmes & Narver team to initiate restoration of life support activities. This effort started in afternoon of 22 August. The Red Hat area received some wind damage but no munitions were involved and no leaks discovered. Daily medical airlift operations from Hickam commenced on 23 August with all island personnel returned by 28 August.

ADC/14AF message 25/2340Z Aug 72 directed deployment of a damage assessment team to J.I. (see Atch 1). Daily reports were provided as required. Final report of this assessment effort follows.

DISCUSSION

Although considerable shore-line and seawall erosion occurred due to heavy waves, the majority of damage was caused by the high winds which removed roofing from various buildings and the subsequent water which entered these facilities. All P437 equipment or support areas, which received water damage through leaking roofs, was located in Buildings 100, 120 or 390. Additionally, some equipment was exposed to residual moisture resulting from condensation caused by sudden power loss in environmentally controlled areas.

With ADC and 14AF approval, the P437 Damage Assessment effort was devoted to system-related equipment and supplies. Damage assessment of all facilities and all was done by 1533W Civil Engineer, and this evaluation is also included in this report, minus cost estimates.

Early, concentrated attention to the corrosion problem corrected what might otherwise have been a very costly recovery. Numerous high cost items in supply, various test equipment and many electronic chassis were exposed to direct water contact. The drying, cleaning and corrosion preventive measures taken did restore all of this equipment to the original status. However, we cannot eliminate possible future problems that may appear as a result of this water damage, especially in those electronic components which are inaccessible. The computer system suffered the worse damage. To offset future problems and to maximize the credibility of both computer sub-systems, depot level assistance is programmed for an early date.

Recovery costs were minimized due to in-house cleanup effort. Costs are detailed in attachments, and are summarized below. Facility and RPIE repair/replacement is being programmed and funded by ISABW, and these costs have not been estimated as yet. Other costs attributable in part to the storm but not estimated are (1) corrosion control at Cox Plant and (2) depot assistance:

COST SUMMARY

Damaged Supply Assets	\$ 2,110.34
Replacement Parts Issued	866.90
Vehicle Repair	100.00
Assessment Team, Travel/Per Diem	2,686.00
Maintenance Deployment for System Verification	19,000.00
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	\$24,763.24

Detailed damage assessment of P437 equipment, sub-systems and supplies is included in Attachment 2, together with photos and costs. Facilities and RPIC are reviewed in Attachment 3, and includes photography but no costs.

CONCLUSIONS

Hurricane CELESTE caused major water entry into GGS-1, GGS-2, Supply and supporting laboratories in Building 120.

With the exceptions of the computer system it appears that all equipment damage has been or will be repaired locally, at a minimum cost.

Facilities and RPIE have, or will be, restored at PACAF expense.

The computer system can be restored with depot assistance. This assistance is presently being provided by Univac.

Corrosion caused by the storm will require a continuing corrosion control effort. This program is in progress.

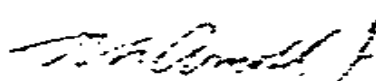
RECOMMENDATIONS

The operational mission of the 437 Program be maintained in the currently authorized standby configuration.

Repair and replace equipment as required to maintain operational status.

Continue long range corrosion control program to minimize replacement cost.

Conduct complete system verification. Verification scheduled 5 Oct thru 26 Oct 1972).


W. A. ARIGLO, COL, Colonel, USAF
Commander

DAMAGE ASSESSMENT 437 EQUIPMENT

With the exception of the Guidance area, which was inflicted with major damage, 437 equipment received minor damage. However, damage to maintenance shops that directly affect the accomplishment of required task, was extensive and required considerable manhours to correct (Photos 1, 2, 3).

All office and maintenance areas sustained water damage from the storm or condensation. The damage was caused by the loss of air conditioning when base power was shut down. All furnishings within these areas had to be washed, cleaned and repaired. Corrosion from water and storm residue had set in prior to the initial return of Det 1 personnel (Photos 4, 5). In some cases, such as typewriters, extensive corrosion occurred. All of this equipment has to be, or is being, repaired. In some cases, such as the typewriters, the unit was disassembled, chemically treated to remove the corrosion, repainted and assembled. No equipment of this type has been lost to date.

The Analytical Lab and Lox Clean Facility sustained water entry through the walls, vents and roof. All equipment was contaminated from storm residue requiring corrosion

control, cleaning and recertification. The Analytical Lab and Lox Clean Room has been completely refurbished and certified. All surfaces were cleaned and painted. All test equipment repaired and certified. Approximately 2,500 items of hardware required to support the Lab and Clean Room were contaminated and are being processed through the Lox Cleaning Facility (Photos 6, 7). Sufficient hardware has been cleaned to support the facility at this time.

Following is a categorized detailed breakdown of damage inflicted to 437 equipment inclusive with photographs.

1. DIRECTION CENTER (D.C.) BLDG 100

A. No appreciable damage was encountered to equipment in the D.C. Two (2) Skid Mounted Power Switchboards (SMPS), located outside Bldg 100, received superficial external damage. (Status: Operational).

1. Damage Assessment (AGE).

- a. SMPS - Prime Unit: Ventilation ducting and support brackets torn off.
* (Photo 8).

ACTION: Repaired locally.

COMPLETION: 8 Sep 1972. No Cost.

b. SMPS - Backup Unit: Air condition duct torn off. Painting and metal work patching required (Photo 8). This unit is in a "storage" status.

ACTION: Being repaired locally.

COMPLETION: Estimated Completion Date: 5 Oct 1972. No Cost.

NOTE: SMPS will no longer be required upon completion of the power conversion modification.

c. The television camera mount, located atop the main building, has been damaged (Photo 9).

(1) Pan and tilt unit connector broken.

(2) TV camera hood and mounting hardware damaged.

ACTION: Repaired locally.

COMPLETION: 25 Sep 1972. No Cost.

d. Local temporary repair of the fence has been completed. Fencing will no longer be required after completion of the power conversion modification (Photo 8).

II. LAUNCH ENPLACEMENT

A. Both of the launch complexes (LE-1 & LE-2) and the Aerospace Ground Equipment (AGE)

were subjected to varying degrees of damage, due mostly to flying debris. All AGE has been functionally checked and will meet operational requirements.

1. Damage Assessment (LE-1 & AGE)

- a. Missile Checkout Trailer (MCOT): Canvas flaps on equipment cooler doors torn.

ACTION: Repaired locally.

COMPLETION: 12 Sep 1972. No Cost.

- b. Missile Shelter: Hood torn off #3 Air Conditioning Unit (Photo B10).

ACTION: Repaired locally.

COMPLETION: 20 Sep 1972. No Cost.

- c. Fuel Tank: Exterior tank insulation torn (Photo B11).

ACTION: Being repaired locally.

COMPLETION: Estimated Completion Date: 5 Oct 1972. No Cost.

- d. Power Distribution Trailer (PDT): Air exhaust door brace broken. Canvas cover torn.

ACTION: Repaired locally.

COMPLETION: 22 Sep 1972. No Cost.

e. Public Address (P.A.) Fuel Side Reventment: Support bracket broken.

ACTION: Being repaired locally.

COMPLETION: Estimated Completion Date: 5-7 Oct 1972. No Cost.

f. Communication Station #BIB (LOX Side). Received water damage.

ACTION: Repaired locally.

COMPLETION: 1 Sep 1972. No Cost.

.. Damage Assessment 11-13 REI.

a. Missile Checkout Trailer (MCOCT): Canvas flaps on equipment cooler doors torn.

ACTION: Repaired locally.

COMPLETION: 22 Sep 1972. No Cost.

b. Fuel Tank: Exterior tank insulation torn (Photo 11a).

ACTION: Being repaired locally.

COMPLETION: Estimated Completion Date: 5 Oct 1972. No Cost.

c. T.V. Camera: LOX Side T.V. camera hood dented (Photo 12).

ACTION: Repaired locally.

COMPLETION: 25 Sep 1972. No Cost.

- d. Missile Shelter: Hood torn off #1 Air Conditioning Unit (Photo 10).
ACTION: Repaired locally.
COMPLETION: 11 Sep 1972. No Cost.
- e. Junction Box (Fuel Side): Access door bent.
ACTION: Repaired locally.
COMPLETION: 28 Sep 1972. No Cost.
- f. Junction Box Box Side: Paint pitted from coral debris (Photo 13).
ACTION: Repair locally.
COMPLETION: Estimated Completion Date: 5 Oct 1972. No Cost.

III. BLOCKHOUSE -- Bldg 790

A. Operational capability of the Blockhouse has not been impaired. Damage incurred is of a minor nature, consisting of moisture accumulation on interior cabinet equipment surfaces. This facility received no water damage internally. Moisture accumulation to equipment is attributed to air conditioning shutdown.

1. AGE Damage:

- a. T.V. Consoles: LE-1 & LE-2. Water from condensation, accumulated on camera control units. Corrosion on transformer laminations and several potentiometers (Photo 14).

ACTION: Repaired locally.

COMPLETION: 22 Sep 1972. No Cost.

- b. All Consoles: Various degrees of mildew and mold on interior cabinet surfaces.

ACTION: Repaired locally.

COMPLETION: 22 Sep 1972. No Cost.

- c. P.A. Speaker: Located on roof of Control Center -- support bracket broken.

ACTION: Repair locally.

COMPLETION: Estimated Completion Date: 5 Oct 1972. No Cost.

- d. T.V. Camera: Located on roof of Control Center -- hood housing dented.

ACTION: Repaired locally.

COMPLETION: 12 Sep 1972. No Cost.

IV. SURVEILLANCE & INSPECTION AREA (S&I WEAPONS).

- A. No damage to the S&I Aerospace Ground Equipment (AGE). All assigned equipment has been inspected and operationally checked.

V. GUIDANCE

A. General: Equipment sustained major water and humidity damage. Extensive corrosive action on aluminum framing, racks and chassis. A detailed corrosion control effort is underway to correct damage and prevent further deterioration. Most of this damage can be corrected at organizational level; however, depot assistance has been requested for the computer systems to effect total recovery which is beyond the capability of assigned personnel. Depot assistance was required to determine the extent of damage and to give instructions on recovery methods for both radar and computer systems.

B. Damage Assessment:

1. 352-- 0109 100'

a. Computer System:

- (1) 6428 Computer - some corrosion. Operational. Further depot checkout required.
- (2) 1004 Processor - Major exterior and interior corrosion. Partly inoperable. Depot assistance requested (Photos 15, 16, 17, 18).

- (3) 1232 Input/Output Console - Heavy corrosion on keyboard, printer and tape reader. Further depot assistance requested; keyboard was cleaned during assessment visit by Univac. Operational.
- (4) 1240 Magnetic Tape Unit - Minor corrosion; pitting on tape transports. Further depot assistance requested. Operational.
- (5) 2009 Card Punch - Major corrosion. Depot assistance requested. Inoperable (Photos 19, 20, 21).
- (6) Radar Interface Unit/Real Time Decoder - Minor corrosion. Further depot checkout requested. Operational.
- (7) 2040 Milgo Plotter. Some fungus damage; spotty corrosion. Operational. Further depot checkout requested.

ACTION: Depot level team requested.

COMPLETION: Unknown. Estimated Completion Date of Depot Evaluation:
Nov 1972. Cost Unknown.

b. AN/GRM-5 Radar

- (1) Units 7, 8, 9, 10, 11, 12, 15 and 16 received minor to major corrosion. System Operational. (Photos 22, 23, 24, 25, 26, 27, 28, 29).

(2) Antenna cover and supports ripped off. Replacements enroute. Antenna operational.

ACTION: Local repair.

COMPLETION: System operational; however, extensive corrosion is present and will require several months to correct. Cost to date \$434.40.

2. GGS-2 (Bldg 990)

a. Computer System (Photos for GGS-1 are representative of storm damage at GGS-2, as equipment is disassembled by depot for repair. Detail photos of damage will be taken).

(1) 6428 Computer - Minor corrosion. Operational.

(2) 1004 Processor - Major exterior and interior corrosion. Inoperable. Depot assistance requested.

(3) 1232 Input/Output Console - Heavy corrosion on keyboard. Other minor corrosion. Keyboard was cleaned during assessment visit by Univac. Operational.

- (4) 1240 Magnetic Tape Unit - Minor corrosion; some pitting on tape transports. Further depot assistance requested. Operational.
- (5) 2009 Card Punch - Some heavy corrosion. Marginally operable. Depot assistance requested.
- (6) Radar Interface Unit/Real Time Decoder - Capacitor Bank corroded. Other minor corrosion. Operational.
- (7) 2040 Milgo Plotter - Bearing corroded. Left arm assembly corroded. Other corrosion. Operational.

ACTION: Depot level team requested.

COMPLETION: Unknown. Estimated Completion Date of Depot Evaluation:
Nov 1972. Cost Unknown.

.. AN/GRW-5 Radar

- (1) Units 2, 17 and 19 received major corrosion. Operational. (Photos 30, 31, 32).
- (2) Minor corrosion to most units. Operational.
- (3) Antenna cover and supports ripped off. Replacements enroute. Elevation lock broken. Part on order. Antenna corroded heavily; on-island contractor assistance requested. Antenna operational.

ACTION: Local repair. H&N assistance required to sand blast antenna.
Cost estimate has not been received.

COMPLETION: System operational; however, extensive corrosion is
present and will require several months to correct. Cost
to Date: \$422.10.

3. Integrated Message Switch (IMS) - This system apparently suffered little or no
damage. The 2008 Data Transmission Unit in GGS-2 will be checked by depot.
Operational.

ACTION: Awaiting Depot Evaluation.

COMPLETION: Estimated Completion Date: Oct 1972. Cost unknown.

4. Bore sight Antennas - Minor corrosion. Adjustments required. Operational.

ACTION: Local repair.

COMPLETION: Estimated Completion Date: Oct 1972. No Cost.

5. Communications Equipment - Bldg 990.

a. Communications room racks corroded. Operational.

b. Guidance Operations Room. Foot switches, stations G1 and 16 corroded.
Control switching amplifier corroded. Operational.

ACTION: Repaired locally.

COMPLETION: 22 Sep 1972. No Cost.

VI. LOX PLANT (OPERATIONAL ASPECT).

A. No visible damage was found that would hamper plant operation. Damage was limited to water and debris on the floor and equipment with external corrosion to equipment (Photo 832a). Sufficient moisture was in the 900HP electric drive motors to cause low resistance readings. Heat lamps were applied to the electrical components for several days to insure all components were dry prior to operation (Photo 32b). The motors were powered up on 12 Sep 1972. A successful operational check was performed.

1. Damage Assessment:

a. External corrosion on plant and support equipment.

ACTION: H&N

COMPLETION: Estimated Completion Date: Dec 1972. Cost unknown.

VII. SUPPLY

A. The storm caused considerable water damage to existing supply stocks and warehouse equipment. A massive effort was expended to thoroughly screen, inspect and repair supply assets. All high cost items were restored.

1. Following is a general listing of those items of equipment which were damaged, removed for inspection/repair and returned to serviceable stock issue, to date. (Photos 33, 34, 35, 36).

		<u>Value</u>
a. Electronic chassis/components	149	\$282,961.00
b. Mechanical items	182	11,384.00
c. Tools	205	

2. Following is a listing of those items which were found to be non-recoverable and were condemned (Photos 37, 38).

<u>Stock No/Part No</u>	<u>Noun</u>	<u>Quantity</u>	<u>Total Cost</u>
a. 6685-624-073	Gauge	3	\$ 19.75
b. 6685-725-5088	Gauge	1	174.30
c. 6685-910-5505	Gauge	1	52.61
d. 6685-806-2931	Gauge	1	25.68
e. 6685-XC039877K	Gauge		144.30

3. Following is a listing of those items which were issued or ordered for repair of storm damaged equipment; these items were required to determine status and/or prevent further damage/deterioration:

	<u>Stock No/Part No</u>	<u>Noun/Work Area</u>	<u>Quantity</u>	<u>Total Cost</u>
a.	9390-535-7482AD	Rod-Radome/Guidance	4	\$120.60
b.	9390-535-7481	Rod-Radome/Guidance	4	120.00
c.	1430-800-3800	Cover-Radome/Guidance	2	603.60
d.	GS-58138	Power Supply 250V/Guidance	1	.30
e.	5961-724-6902	Transistor/Guidance	4	12.00
f.	5960-080-9824	Tubes/Instrumentation	2	10.00
g.	6240-672-2662	Lamp/Instrumentation	2	.40

4. Approximately 1700 expendable items were water damaged. Total cost \$4,094.38. This stock consisted of gaskets, batteries, light bulbs, paper, tape, hardware, etc. Of this amount, \$2,400.28 was repaired and returned to stock. Total cost of stock not recoverable is \$1,694.00.

COMPLETION: 29 Sep 1972. Total Cost: \$2,077.44.

VIII. VEHICLES

- A. All assigned vehicles received minor damage and corrosive effects from sustained wind and water. Operational capability for all vehicles, general and special purpose, has not been impaired.

1. Following is a detailed list of assessible damage incurred:

	<u>Reg/Serial No</u>	<u>Damage</u>	<u>Action</u>	<u>Estimated Cost</u>
a.	66813164	Windshield Broken	H&N	\$ 50.00
b.	6889536	Windshield Broken	H&N/Replaced	\$ 50.00
c.	59L1198	Creased Right Forward Panel	Local Repair	N/C

DAMAGE ASSESSMENT
FACILITIES AND RPTE

All facilities have been restored to a usable condition. H&N will repair the remaining damage as priority and material permit. The facility damage that affected the LOADS mission was given the highest priority and has been repaired. The PACAF Engineering Survey Team has made a complete inspection of the facility damage; however, a cost estimate and estimated completion date is not available at this time.

Following is a categorized detailed breakdown of damage inflicted to P427 facilities including photographs.

I. BUILDING 100

- A. Building 100 sustained water damage through the roof, eaves and vents. 60% of the roof was blown off, and a portion of the fire wall on top of the building was damaged; no apparent damage to structure of building (Photos 1, 2). The roof has been repaired using a polyurethane compound. The firewall damage will be repaired by H&N.
- B. The false ceiling panels in the briefing room (Photo 3), GGS-1 (Photo 4) and the GGS-1 forward supply point were saturated with water. All panels have been removed and require replacement. ACTION: H&N

- C. The air conditioning ducting for the supply high value storage area, located at the rear of Building 100 was blown off (Photo 5). ACTION: Repaired by H&N.
- D. The chain link fence encompassing the SMPS suffered extensive damage. Temporary repair of the fence has been completed. Fencing will not be required after completion of the power conversion modification (Ref Atch 1, Photo 8). ACTION: Det 1, IGADS.

II. BUILDING 113

- A. The antenna tower, Building 113, sustained damage to the air conditioning unit (Photo 66) and the tower stairway. A temporary air conditioning unit has been installed and the stairway was repaired by H&N. ACTION: H&N
- B. The fence around Building 113 sustained minor damage (Photo 67). Fencing will be repaired as priorities permit. ACTION: H&N

III. BUILDING 119

- A. Building 119 sustained considerable damage. Roof and side panels punctured (Photo 7). Three glass panes and the vent panel on the dock side blown out (Photo 8). Doors and door tracks bent and 20% of the ridge line vent system is gone. ACTION: H&N

- B. Building 119 can be used for limited maintenance, however, the crane and main structural members will have to be checked prior to use. Due to priorities, estimate this building will be repaired around the first of 1973. If missile transfer is required prior to this building being completed, H&N mobile cranes are available. ACTION: H&N

IV. BUILDING 120

- A. Corrugated asbestos roof, gutters and vent system damaged (Photo 9). Repaired by H&N.
- B. Box Clean Room vent ducting on northeast corner torn off (Photo 10). ACTION: Repaired by H&N.
- C. Temporary wooden shed attached to rear of building completely ripped off. Shed is not required and will not be replaced. (Photo 11, see arrows).
- D. Power station fence at the rear of building damaged (Photo 11). ACTION: H&N will repair as time permits.
- E. The corrosion Control Shed (located in front of Building 120) sustained considerable structural damage and was condemned by H&N engineering (Photo 12). An

agreement has been made with Det 3 to jointly use the new H&N corrosion control facility. Det 1 corrosion control equipment will be maintained in Building 119.

ACTION: Det 1, IOADS.

- F. There was considerable damage to the Lox Clean Room and Analytical Lab facilities. The walls, ceilings and floors sustained water damage. In several places the walls were cracked and pieces of mortar/block broken loose (Photos 10, 13, 14).

Det 1 personnel have temporarily restored this area. All walls, ceilings and floors have been scraped, repaired, cleaned and repainted. As indicated in previous reports the area has been certified for lox clean operation. This building is one of the oldest on J.I. and was made with coral block/cement. Moisture seepage and fungus growth has been a continuing problem. The storm only added to an existing deficiency. This building is literally breaking up. ACTION: Undergoing H&N engineering study.

V. LAUNCH COMPLEX

- A. Security Fence: 150 yards of perimeter fence blown over, braces and fence posts broken, motorized security gate damaged. ACTION: H&N, temporary repair of fencing, sufficient for minimum security, has been accomplished by Det 1 personnel.

- B. Cable Trays: Covers blown off and numerous supporting posts broken. (Photos 15, 16). ACTION: H&N
- C. RF Screen LE-1 & 2: All panels require repair/replacement (Photo 17). ACTION: H&N
- D. Fire water system auxiliary switch panel blown over (Photo 18). ACTION: H&N
- E. Firex diesel engine shed lost 30% of corrugated sheet metal roofing. ACTION: H&N
- F. Manhole cover blown off #1 firex water storage tank. ACTION: H&N
- G. Cover and control box panel for firex water valve MV-4 bent. ACTION: H&N
- H. One flood light damaged on box side LE-2 (Photo 19). ACTION: H&N
- I. Three photo lights damaged. ACTION: Repaired by H&N
- J. Camera tower (LE-2) portable scaffolding was superficially damaged. Ladders distorted and wooden landing platforms blown away (Photo 20). ACTION: H&N

VI. BUILDING 701 (LE-2)

- A. Air conditioning cover blown off. ACTION: H&N
- B. Minor roof damage. ACTION: H&N

VII. BUILDING 703 (LE-1)

- A. Minor leaks in roof and section of ceiling wall board about 4' x 4' torn down.
ACTION: H&N

VIII. BUILDING 786 (SECURITY GATE)

- A. One window blown out. ACTION: Repaired by H&N

IX. BUILDING 795 (PAB)

- A. All roofing blown off (Photo 21). ACTION: H&N

- B. Cable trays damaged (Photo 22). ACTION: H&N

X. PERIMETER & INSPECTION AREA (S&I/WEAPONS)

- A. S&I guard gate house demolished. Only electrical control box remains. ACTION:
H&N will replace with portable guard shed.
- B. Approximately 550 feet of fencing on the runway side of the S&I area blown over.
ACTION: H&N. Det 1 personnel have made temporary repairs sufficient for minimum
security required at this time.
- C. Cover on one perimeter light broken. ACTION: H&N

XI. BUILDING 787 (S&I MAINTENANCE BUILDING)

- A. Insulation and ducting damaged on air conditioner located at the rear of building.
(Photo 23). ACTION: H&N
- B. Four covers blown off air handlers. ACTION: Repaired by H&N

- C. Vent system electric motor and fan blown off. ACTION: Repaired by H&N
- D. Switch panel door ripped off. Located outside, at rear of building (Photo 23).

ACTION: H&N

XII. BUILDING 789 (SBI STORAGE SHED)

- A. All corrugated sheet metal blown off three sides and roof (Photo 24). ACTION: H&N
- B. Two 2 x 4's broken (Photo 24, see arrow). ACTION: H&N

XIII. BUILDING 878 (SUPPLY PULP WAREHOUSE)

- A. 90% of the roofing blown off and roof vents damaged. ACTION: H&N

XIV. WHL STORAGE AREA

- A. Corrugated metal roof blown off (Photo 25, 26). ACTION: H&N
- B. Security fence and gates damaged (Photo 25, 26). ACTION: H&N

XV. BUILDING 909 LIX PLANT

- A. Exhaust fan louvers received minor damage. Northern side of building. (Photo 27).
ACTION: H&N
- B. Sheet metal siding floor to roof broken loose (Photo 28). ACTION: H&N. No structural damage, metal can be tacked back in place.
- C. Two lightning rods broken loose on western side of building. ACTION: H&N

- D. Emergency shower panels blown off of two showers (Photos 29, 30). ACTION: H&N
- E. Six flood lights received minor damage (Photo 30). ACTION: H&N
- F. Roof mounted air conditioning unit rotated 60° and twelve feet of ducting torn loose (Photo 31). ACTION: H&N
- G. Roof vent blown off of mount (Photo 31). ACTION: H&N
- H. Window glass broken on southern side of building. ACTION: H&N
- I. Security fence on runway side damaged. ACTION: H&N

XVI. BUILDING 202 LDX PLANT STORAGE SHED

- A. Roof 100% blown loose. ACTION: H&N
- B. Protective grill for roof mounted air conditioner damaged. ACTION: H&N

XVII. BUILDING 160 XGS-11

- A. 90% of roofing blown off (Photos 32, 33). ACTION: Roof repaired using polyurethane compound.
- B. False ceiling water damaged throughout building. ACTION: H&N